## Sixteenth Marcel Grossmann Meeting



Contribution ID: 550

Type: Invited talk in the parallel session

## Causal fermion systems: Classical gravity and beyond

Monday, 5 July 2021 17:30 (20 minutes)

The theory of causal fermion systems is an approach to fundamental physics. It gives quantum mechanics, general relativity and quantum field theory as limiting cases and is therefore a candidate for a unified physical theory. The dynamics of causal fermion systems is described by a variational principle called the causal action principle (for more details see https://causal-fermion-system.com).

In the talk, I will outline how and in which sense the causal action principle gives rise to classical gravity. Moreover, I will explain in various examples how to go beyond classical gravity:

- The general definition of the total mass of a static causal fermion system

- A general connection between area change and matter flux

- Geometric structures giving a setting of Lorentzan quantum geometry

We conclude with an outlook on quantum gravity.

**Primary author:** FINSTER, Felix (Universität Regensburg)

Presenter: FINSTER, Felix (Universität Regensburg)

Session Classification: Mathematical Problems of Relativistic Physics: Classical and Quantum

**Track Classification:** Alternative Theories: Mathematical Problems of Relativistic Physics: Classical and Quantum